

It's my world

Imagination for a Cleaner Environment



Indian
Centre for
Plastics in the
Environment



Indian Centre for Plastics in the Environment

**ICPE is a non-profit making, independent body.
Its members are Plastics, Resin and Chemical Manufacturers,
Processors, Convertors, Exporters, Machinery & Equipment Suppliers,
Plastic Training & Education Institutes and Recyclers.**

VISION

**To improve the knowledge and understanding of
the environmental benefits of plastics and to represent
the plastics industry in promoting responsible use and
recovery of plastics resources.**

MISSION

**To work in partnership with government and local bodies,
non-governmental organizations and industry to
advance solid waste solutions that optimise
Recovery, Reuse and Recycling for
sustainable development.**

**To provide information on plastics, environmental performance,
attributes and benefits in resource conservation over
the entire life cycle of plastic products.**

To encourage sustainable plastics recycling.



Indian Centre for Plastics in the Environment

Indian Centre for Plastics in the Environment (ICPE), set up on the recommendation of a Task Force constituted by the Ministry of Environment and Forest (MoEF), is a body registered under the Societies Act.

It is a nodal agency to handle all issues related to plastics and the Environment in the country. ICPE aims at improving the knowledge and understanding of the environmental benefits of the responsible use and disposal of plastics.

It represents the industry's efforts to encourage, promote and support up gradation of plastics waste management in India and to develop an education and awareness campaign for responsible use and disposal of plastic waste - a small subset of a larger waste management and disposal issue.

Plastics Waste in Total MSW

Studies have shown that, plastics contribute only about 6% of our municipal solid waste (MSW) in large metros. The figure is much less in smaller cities which means the other 94% is made up of other materials. So the issue is not of plastic disposal, but of garbage disposal and anti-littering.

ICPE has, therefore, undertaken this programme to spread the message among India's future citizens. We believe that protecting our environment and keeping our surroundings clean is our problem - the problem of every citizen, and can be solved by motivating the younger generation students to think, and spread the message of proper waste management.

Students can make a difference - a big one. They can get involved, encourage proper waste management techniques at home, become aware of the littering problem in their localities and neighbourhoods, point out the sources of litter and help remove litter. And most importantly, they can educate and inform their families, friends and neighbours.

Since keeping our cities clean begins with each one of us, **It's My World** seeks to inform and encourage students to take up the challenge to keep their environment clean and spread the message in their homes, societies, localities and cities.

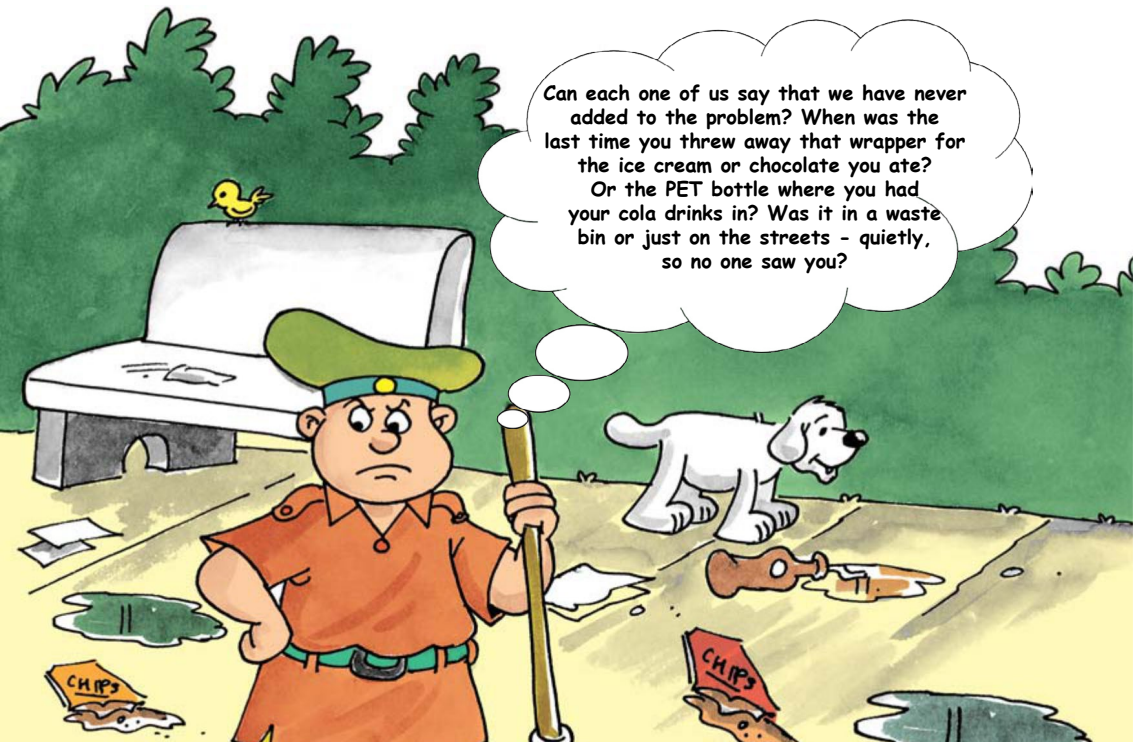


Students of Appejay School, Saket, New Delhi, listening attentively to a presentation made by Shri A.N.Bhat on 27th Dec - 2012

A Concept to Educate and Encourage Students to Keep the Environment Clean

Just as we like to live in clean homes, it would be so nice if our societies, localities, streets, parks, and beaches remain as clean. But today, when we walk down the streets in our societies, towns, cities we see litter all around us - sometimes garbage bins have more litter around them than inside them.

When you go to a picnic with all your friends, suppose you throw away the food packets, plastic bags, water bottles after use - imagine how dirty the park or the road will look. This also leads to unhygienic conditions and can be harmful to humans and animals.



In every picnic spot, park or even roads, bins are kept for disposing empty packages and discarded food.

Bin culture is making sure that everyone disposes all waste properly in marked bins.

This will make it easy to collect, segregate and dispose waste properly. It will help to keep our surroundings and environment clean. It is so easy to blame the litter and accuse paper, plastics, tin foil and food waste for making our environment dirty and unhealthy. But does paper, plastics, tin, foil and food waste appear magically on our streets and in our neighbourhoods? No, it's thrown away and disposed of irresponsibly by each one of us!

Waste management in our cities continues to be a problem due to our littering habits and inadequate waste management systems. If we as responsible citizens use and dispose of waste correctly, we can contribute to protecting our environment, conserving natural resources and keeping our cities clean.



Students watching Awareness Film "Listen Plastics Have Something to Say" at ICPE Stall in PIF - 2012 Exhibition, New Delhi

Put Litter / Waste in its Place

At Your Home

Our homes generate a variety of waste everyday. This could be food packaging, vegetable peels, leftover food, paper, wood, plastic bags, broken glass material, etc. Earlier all of this waste was mixed together and disposed of. When different types of waste are mixed together, it is difficult to recycle those properly.

We sell old newspapers, glass bottles, old electronic items to the raddiwallas and kabadiwallas (waste traders) - because there is a value in them. There is value in the waste we dispose of everyday as well. We can unleash this value only if each household separates its waste into wet and dry.

At home, we should separate our waste into dry waste (which can be recycled) and wet waste (which is biodegradable). This is called the "bin" culture and is done by citizens of developed countries across the world.

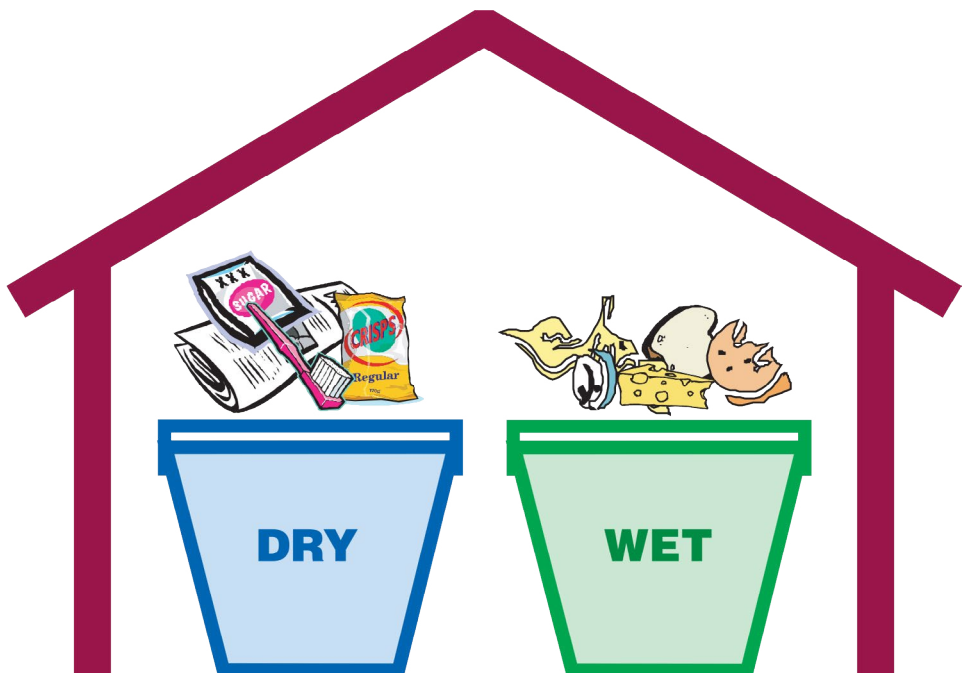


School children queuing up to see the Panels displayed at PIF - 2012 Exhibition, New Delhi

Wet Waste: Food, vegetable peels, egg shells and other organic materials: these are biodegradable and can break down and become compost or soil within a short period. Therefore, this waste should go into the landfills or into a compost pit. You can build your own compost pit in your colony/home and convert all wet waste into useful manure. This would reduce the pressure on our landfills also. Many developed countries do not have any landfill - all wet wastes are treated to recover energy or composted.

Dry Waste: Paper, plastics, tin, foil, glass, cloth and other materials that do not biodegrade. These materials can be recycled and made into useful products.

Therefore, each one of us must separate our waste into Wet Waste and Dry Waste at our home itself and dispose of the same properly.



On the Roads and in Public Places

Today, as we walk down the streets we see paper and plastic bags, cans, PET bottles, food and other items carelessly thrown about dirtying our cities. This leads to unhygienic conditions and can be harmful to humans and animals.



We should not litter our streets. Don't throw away the plastic bag in which you carried your vegetables or PET bottle from which you drank your water, carelessly on the streets. They can be reused or recycled. So take it home or dispose it responsibly.

The littering problem has become a huge issue today-as we hear about animals dying due to consumption of plastic bags containing food waste wrapped in them - although plastic itself is a non-toxic material.

Remember that food items or food waste should not be thrown wrapped in plastic garbage bags. Plastic bags should be used only for transporting and disposing food waste to the wet waste collection / landfill / composting area. This will prevent injury to animals and ensure proper waste disposal.



Plastic garbage bags, after use, should be collected and reused or sent for recycling. Further, tin containers and glass bottles should be disposed of separately and carefully. This will prevent possible harm to people and animals. Many of the items you carelessly throw away can be reused or recycled if disposed of properly. So stop littering and stop others from doing so and be conscious of keeping your surroundings clean and hygienic. This will also lessen the burden on local authorities responsible for waste management.

Solid Waste



Recycled Plastic Products



Agriculture



Recycling of Plastics Waste



Composting



Paper, Tin, Glass, etc.



Sale of Dry Waste



*Hazardous Waste
Keep separately and
dispose separately*

Management



Dry Waste

Wet Waste



Dump Yard



Segregation

Segregated Dry Waste



Segregation Process



pickers with Van



Waste being carried for loading into Municipality Van



other view of Dry Waste segregation



Segregated Dry Waste being weighed and sold to recyclers / traders

Segregation Data of Select Mumbai Wards by about 80 waste pickers

2004		2005	
Weight (Kgs)	Value (in ₹)	Weight (Kgs)	Value (in ₹)
Non-Plastic: 215892	Plastic: 26920	Non-Plastic: 247606	Plastic: 24206
Non-Plastic: 147060	Plastic: 149987	Non-Plastic: 133061	Plastic: 187113
2006		2007	
Non-Plastic: 215896	Plastic: 26920	Non-Plastic: 247606	Plastic: 24206
Non-Plastic: 147067	Plastic: 149987	Non-Plastic: 133061	Plastic: 187113
2008		2009	
Non-Plastic: 188132	Plastic: 26200	Non-Plastic: 219008	Plastic: 24206
Non-Plastic: 127061	Plastic: 149133	Non-Plastic: 102761	Plastic: 182206
2010		2011	
Non-Plastic: 212061	Plastic: 26200	Non-Plastic: 219008	Plastic: 24206
Non-Plastic: 127061	Plastic: 149133	Non-Plastic: 102761	Plastic: 182206

Segregation

Once your household waste is separated into Wet Waste and Dry Waste your housing society, colony or lane must arrange to have this collected separately. The wet waste will go to the municipal authorities for the landfill or to the composting pit.

The dry waste is taken to a central location where it is further segregated by trained ragpickers into various categories - wood, paper, plastics, glass, etc., and collected. The ragpickers then sell this in bulk to scrap dealers, who in turn sell it to recyclers.



Waste Management initiative at eco-sensitive Hill Station, Matheran near Mumbai

Recycling

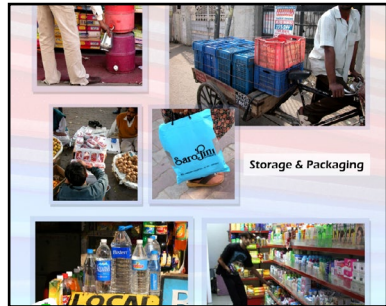


Recycling of waste material will go a long way towards solving the garbage problem. When materials are sold to the kabadiwallas or scrap dealers - either directly by you or through the ragpickers - they end up at the recycling plants. Plastics for example are then washed, processed and pelletised in special machines and converted into useful products for use. Following products can be made out of recycled plastics - footwear, mats, plastic benches, road dividers, luggage, box strapping and a host of other products of daily use.

Recycling Process



Recycled Plastics Products



Benefits of Recycling

- Reduces the amount of solid waste that requires disposal
- Reduces the amount of energy required to manufacture raw materials for new products
- Reduces energy involved in obtaining new raw materials
- Provides employment opportunities for rag pickers and recycling industry
- Provides low-cost products to a large number of people
- Helps resource management. Saves natural resources, including non-renewable resources such as petroleum. Conserves forests and trees

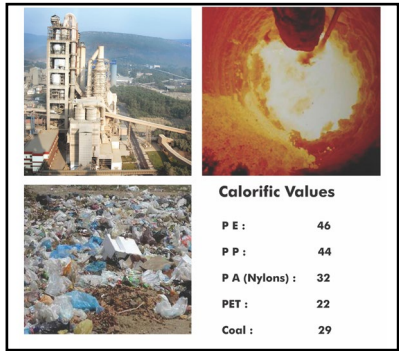
Recycled Plastics Products



Uses of Plastics Waste



All kind of mixed plastics waste can be used for the construction of Asphalt Road



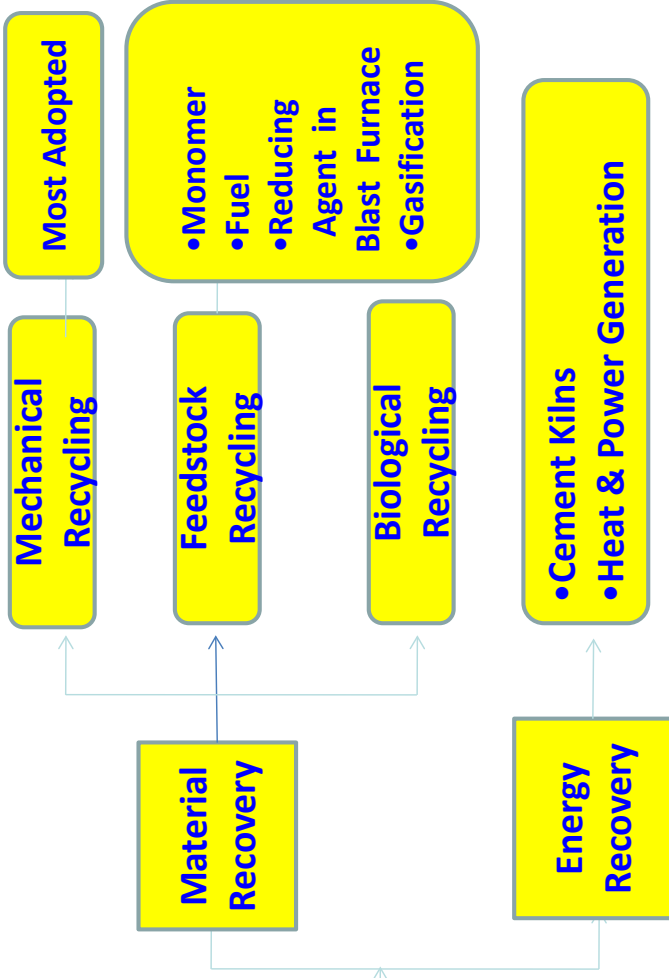
All type of mixed plastic waste can be co-processed in cement kilns, as a source of energy.



All type of mixed plastic waste can be converted into Hydrocarbon Fuel

PLASTICS RECYCLING / RECOVERY OPTIONS

ISO 15270:2008



Major Reasons of Environmental Pollution

Air Pollution

Water Pollution

Soil Pollution

Green House Effect & Global Warming

Depletion of Ozone Layer

Role of plastics causing Environmental Pollution

Air Pollution

Major Pollutants	Source Responsible	Role of Plastics
SPM (Suspended Particulate Matters)	Fuel Burning / Boilers Dust Storm Volcanic Eruption Cement Mining / Quarrying	Insignificant
SO ₂ (Sulphur Di-oxide)	Fuel Burning H ₂ SO ₄ (Sulphuric Acid) Incineration Chemical Industries Smelting Refinery	92% Refinery Products are for Non-Plastic Application
NO _x (Nitrogen Oxide)	Petroleum Operations, Automobile and Industrial Combustion	Insignificant With Plastics
CO (Carbon Mono-oxide)	Incomplete Combustion of Fuel & HC in Industries and Automobiles	Can be avoided by corrective way of processing

Major Raw Materials used for Manufacturing Plastics

- △ Ethylene
- △ Propylene
- △ Chlorine
- △ Vinylchloride Monomer
- △ Benzene

Though these materials are considered critical, Threshold Limit Value (TLV) and Immediately Dangerous to Life or Health (IDLH) Limits are defined and maintained. Manufacturing of plastics raw material is carried out in large companies having all modern technologies for safe handling of these toxic gases.

However, when these materials are converted into Plastics, they become inert and safe.
(See Chart on Page 23)

Emissions Possible During Processing /Burning of Commodity Plastics

CO_2	CO_2 is produced when any organic material like wood, cloth, etc., is burnt.
CO/Acrolein/ Aldehyde	At Fire Situation in insufficient air (Common Phenomenon in case of Wood also).

Plastics do not add any additional danger to these causes.

Dioxin and Plastics



2,3,7,8- Tetrachlorodibenzo-p-dioxin

Source : Both Natural & Man Made

- ◇ Commercial/ Municipal Waste
- ◇ Burning of Fuel (Coal, Wood, Oil)
- ◇ Burning of Household Waste
- ◇ Chlorine Bleaching of Pulp and Paper
- ◇ Some Chemical Manufacturing Process
(Not Known for Commodity Plastics)
- ◇ Forest Fire
- ◇ Cigarette Smoke

Plastics have not been singled out as the one causing
Dioxin Generation

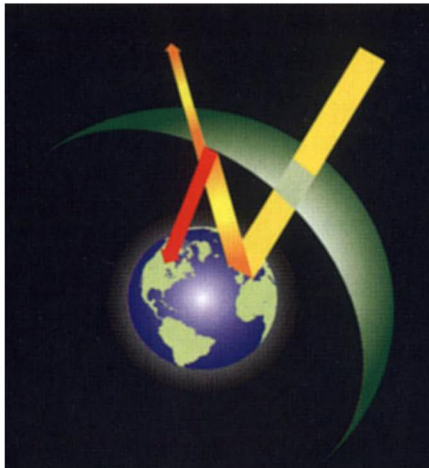
Water and Soil Pollution

- » Plastics do not Pollute Water and Soil.
- » It Transports and Stores Potable Water and Preserves Soil from Erosion.



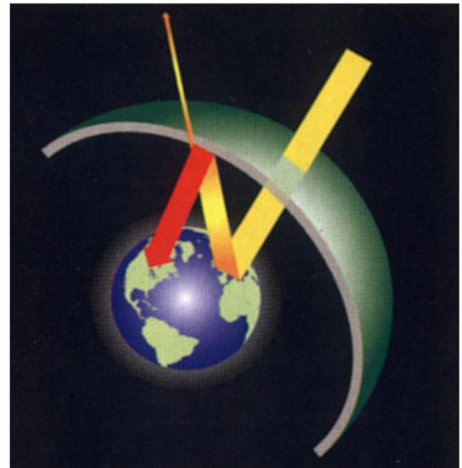
GLOBAL WARMING

GLOBAL WARMING & GREEN HOUSE EFFECT



Normal Conditions

Earth's Surface reflects heat from the sun, and some of this escapes through the atmosphere into space.



Global Warming

When greenhouse gases build up in the atmosphere they absorb reflected heat, stopping its escape back into space.

MAIN GREEN HOUSE GASSES

Green House Gases	Global Warming Potential (GWP)
Carbon dioxide - CO ₂	1
Methane - CH ₄	21
Nitrous Oxide - N ₂ O	310

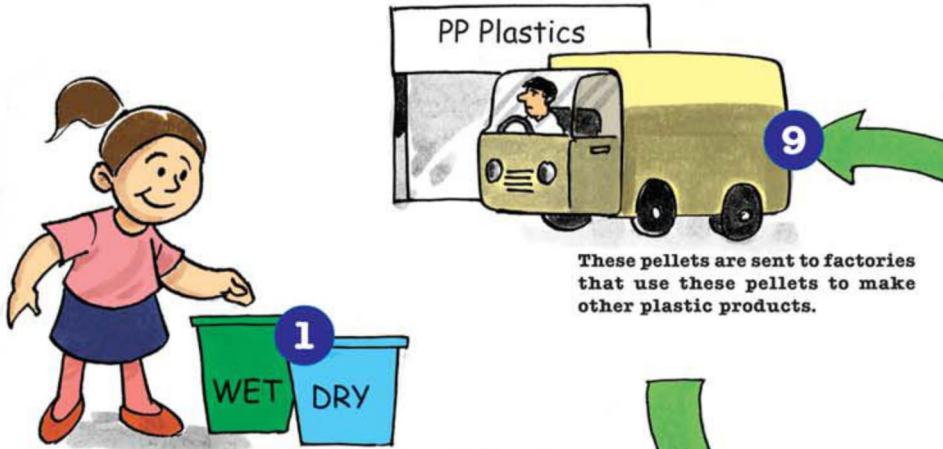
Explanation

CH₄ causes 21 times more GHG effect than that of CO₂

Source : Ewings, 2007



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These pellets are sent to factories that use these pellets to make other plastic products.

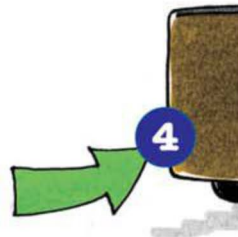
Throw your household wet waste (vegetable leftovers, fruit peels) and dry waste (plastics, bottles, paper) in 2 separate bins.



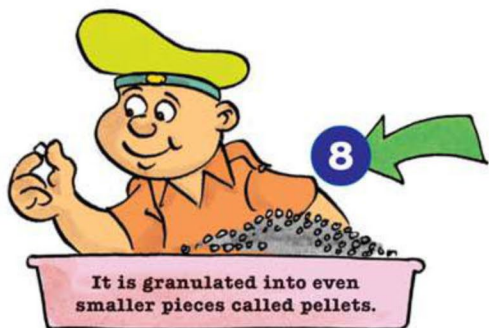
Wet waste is collected by the garbage trucks and kept in separate dumping grounds. It can also be converted into a vermiculture pit for converting wet waste into compost.



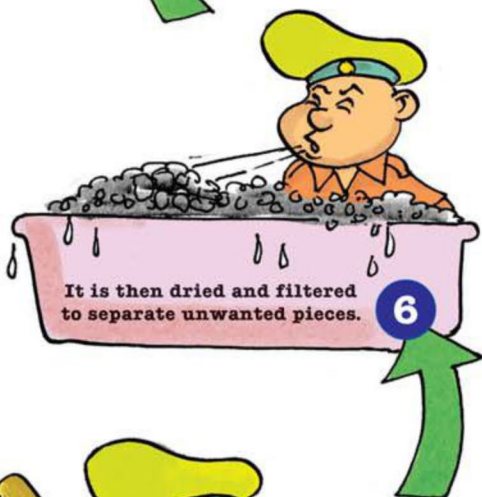
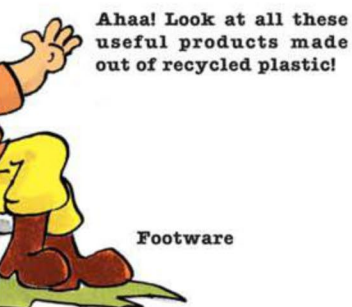
The dry garbage is further segregated into wood, plastics, paper, etc. Plastics are further segregated into PET bottles, bags, sheets, etc.



Recycling of Plastics



7 Recycling Plant.



Plastics waste is sold to a recycler.



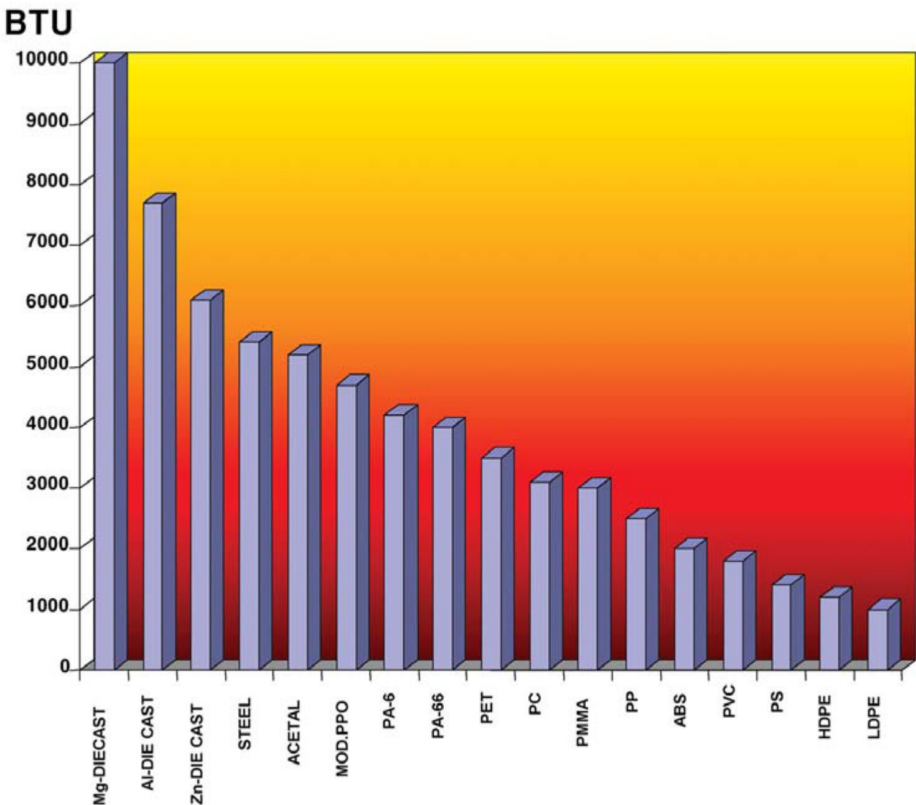
Identified ODS's (Ozone Depleting Substance)

CFC : Chlorofluorocarbon
Halons : Carbon Tetra Chloride
MMF : Methyl Chloroform

» CFC 11 & CFC 12 are being Replaced by Cyclopentane, A Non-ODS.

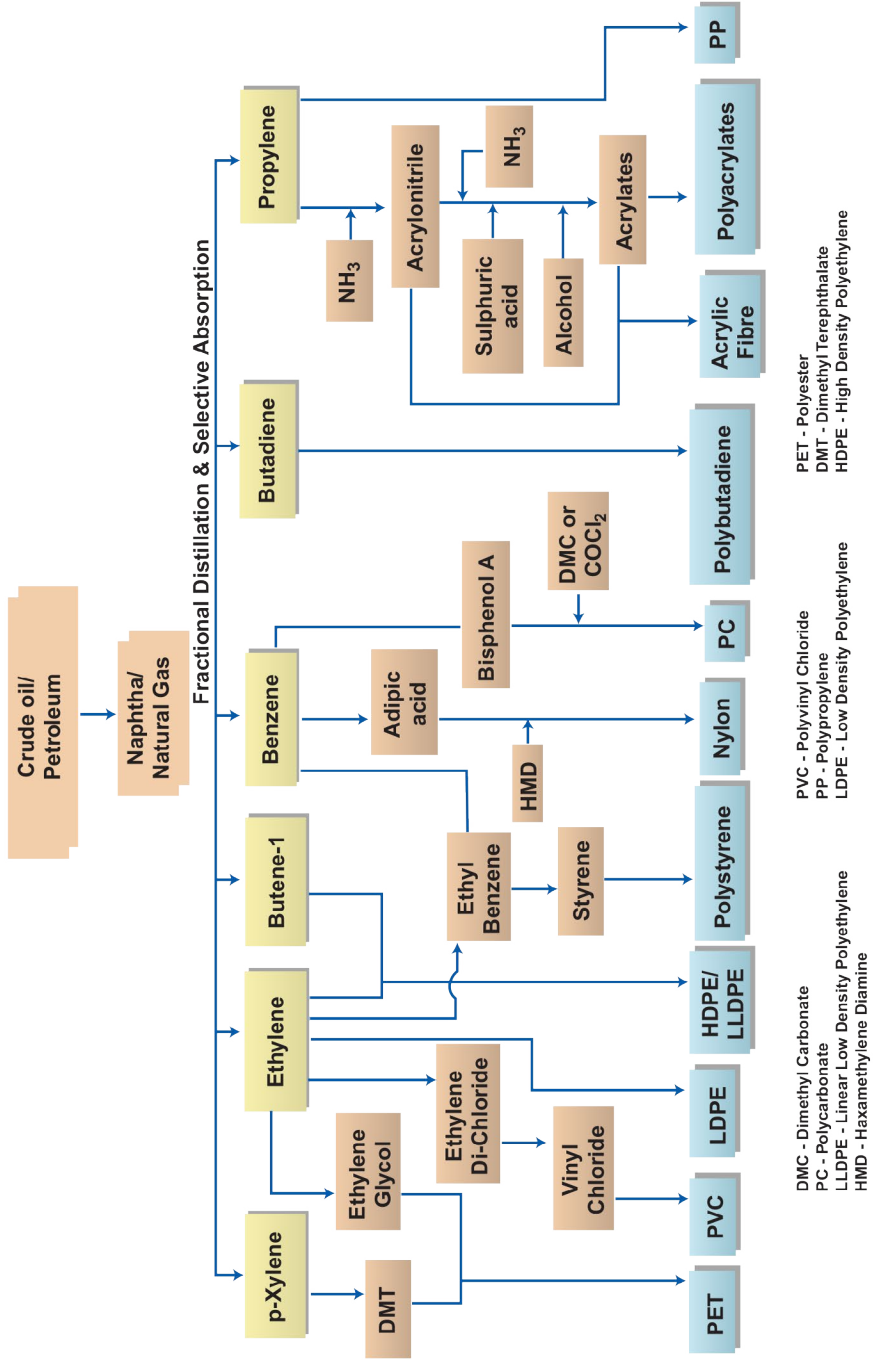
Plastics do not contribute to these

Energy Requirements of Various Materials



Plastics Save Energy

Major Raw Materials used for Manufacturing Plastics



How to Make a Vermicompost Bin

Vermicomposting is the process of recycling organic matter into nutrient-rich compost using worms. Choose a strong plastic bucket/basket. Rinse your container well to remove any residues that may be harmful to the worms. Now make small holes on all sides of the bucket and the most important step will be to place the layers correctly to make the 'magic bucket' effective.

Layer 1: Two inches of small stones

Layer 2: Two inches of mud

Layer 3: Add vermicompost/biocompost (available at a plant nursery)

Layer 4: Spread 50 gms of composter (a mix available at waste segregation centers)

Layer 5: Finally add dried leaves and spread them evenly. Your vermicompost bin is now ready!

Points to Keep in Mind...

- Waste items should be cut into smaller pieces and spread evenly in the bin
- Do not throw waste water in these buckets
- You can sprinkle a little lime powder to avoid the stench
- Do not throw in metal or paper waste. give them to your kabadiwalla for recycling.



*Vermicompost Pit - IPCL Township, Nagothane,
Maharashtra (2004)*

The 3Rs

REUSE

Use your old plastic bags several times.

- Save your plastic bags
- Take your old bags with you for shopping
- Reuse plastic bags to store clothing
- Plastic bags are flexible, keep one buy something on the way home.



RECYCLE

Plastic bags & other plastics waste can be made into useful products ... if only they are disposed of responsibly.

- If a plastic bag cannot be reused again, dispose it of in your dry waste garbage bin.
- If you have more bags than your requirement. Sell them to your kabadi-walla for a price - just like your mother does with old bottles and newspapers.



RECOVER

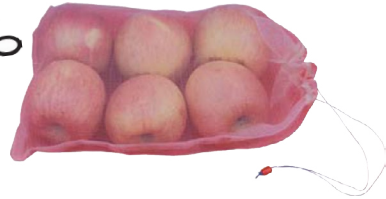
Plastic waste has a high calorific value, equivalent to coal and oil, which can be safely and cleanly released through combustion to generate heat and/or power. Pre-sorted mixed plastic packaging waste, for example, has been used effectively as a substitute for coal in energy-intensive processes such as cement manufacture in some countries. Already across Europe, over 2.6 million tonnes of plastic waste is used each year replacing fossil fuels to produce useful heat and/or power. In

India also Co-processing of Plastics Waste in Cement Kilns and conversion of Plastics Waste into Hydrocarbon Fuel has started in commercial scale.





7,00,000 trees can be saved annually by using plastic for packaging and transporting apples alone



Of our total municipal solid waste only 6% is plastic



Average consumption of plastic in India is 7 kgs against the world average of 29 kgs



Plastic water pipes
have provided clean
and safe drinking
water to millions
of citizens

Plastic furniture
has helped save
1,40,000 cubic
metres of wood



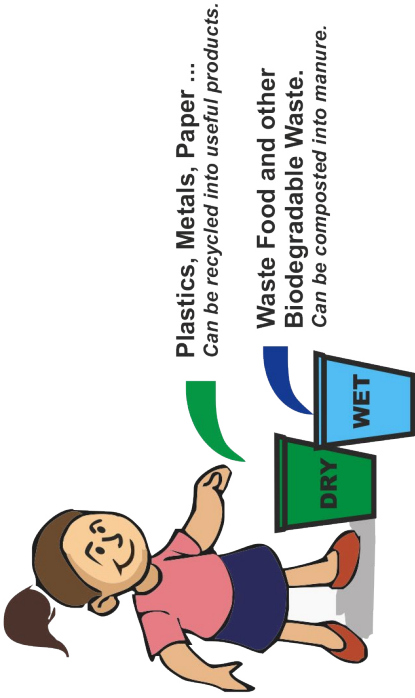
Plastics are used to
make medical blister
packs, life saving
saline packs, blood
bags and aseptic
syringes



Plastics
are used to
make airbags,
seatbelts, baby toys,
bike helmets
and medical
devices

Do Not Litter Keep Your Environment Clean

- Segregate and Throw Waste Only in Waste Bins.
- Use Two Bins - One for Wet Waste, One for Dry Waste



What goes where ?

Recognize wet & dry waste. Mark an from the object to show which bin the article will be put in.



Dry Waste



Wet Waste

Paper

Fruit, Flower & Vegetable Waste

Glass

Chocolate Wrapper

Old Toothbrush

Broken Pencil

Cloth Rags

Thermocol / Foam, Plastics

Left over food

Rubber

House Sweepings

Rexine

Egg Shells

Soiled tissues, Cotton, etc.

Used Cans

Old Leather Bags

Food Waste

Dry : Paper, Glass, Chocolate Wrapper, Old Toothbrush, Broken Pencil, Cloth rags, Thermocol / Foam, Plastic, Rubber, Rexine, Used Cans, Old Leather Bags
Wet : Fruit, Flower & Vegetable waste, Coconut shells, Wood Shavings, Left over Food, House Sweeping, Egg Shells, Soiled tissues, Cotton etc.



Indian Centre for Plastics in the Environment

(An Autonomous National Body Registered Under Societies Act, 1860)

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